

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A liquid processing apparatus comprising:
a liquid processing section for applying a predetermined liquid processing to a substrate;
a carrier delivery section for delivering a carrier having a plurality of substrates housed therein;
a carrier stock section capable of storing a plurality of carriers;
a substrate transfer section for transferring ~~the substrate~~ a plurality of substrates from a carrier on the carrier stock section into said liquid processing section;
a carrier transfer device for transferring ~~the a~~ carrier within said carrier stock section;
a substrate inspecting device for inspecting the number and/or ~~the~~ housed state of substrates within ~~the a~~ carrier; and
a carrier transfer device control section for controlling said carrier transfer device ~~such that the carrier is stored in said carrier stock section in the case where it is judge possible to apply a liquid processing to the substrate on the basis of the result of the inspection performed by said substrate inspecting device,~~
wherein the carrier stock section includes carrier holding members for holding carriers, and a substrate delivery stage through which substrates are transferred between the substrate transfer section and a carrier,
the carrier transfer device control section controls the carrier transfer device to store a carrier on the carrier holding members of the carrier stock section, when it is judged possible to apply a liquid processing to substrates in the carrier with reference to an inspection result obtained by the substrate inspecting device, and
the carrier transfer device control section further controls the carrier transfer device, after a predetermined number of carriers are stored on the carrier holding members, to transfer the carriers from the carrier holding members to the substrate delivery stage, thereby allowing substrates housed therein to be transferred into the liquid processing section by the substrate transfer section.

Claim 2 (currently amended): The liquid processing apparatus according to claim 1, wherein said carrier transfer device is also capable of delivering ~~the~~ a carrier into and out of said carrier delivery section, said substrate inspecting device inspects ~~the substrate within the~~ substrates within a carrier transferred into said carrier stock section, and said substrate transfer section transfers ~~the substrate~~ substrates between said carrier stock section and said liquid processing section.

Claim 3 (currently amended): The liquid processing apparatus according to claim 1, wherein said substrate inspecting device is capable of inspecting ~~the~~ substrates within ~~the~~ a carrier in the position where the substrates are delivered between said substrate transfer section and the carrier.

Claim 4 (currently amended): The liquid processing apparatus according to claim 1, wherein ~~the~~ a carrier has a delivery port for delivering ~~the~~ substrates into and out of the carrier and a lid for opening/closing said delivery port, and said apparatus further comprises a lid opening/closing mechanism for opening/closing said lid when the substrates within the carrier are inspected by said substrate inspecting device and/or the substrates are transferred between the carrier and said substrate transfer section.

Claim 5 (currently amended): The liquid processing apparatus according to claim 1, wherein said carrier transfer device is controlled by said carrier transfer device control section such that ~~the~~ a carrier, for which it has been judged that the liquid processing of the substrates within the carrier should be stopped, is returned back to said carrier delivery section.

Claim 6 (currently amended): The liquid processing apparatus according to claim 1, wherein said carrier transfer device is controlled by said carrier transfer device control section such that, where another carrier, which is to be processed and forms a pair with ~~the~~ a carrier for which it has been judged that the liquid processing of the substrates housed in the carrier should be stopped, is already stored in said carrier stock section, the another carrier is returned to said carrier delivery section.

Claim 7 (currently amended): The liquid processing apparatus according to claim 1, wherein the liquid processing of ~~the substrate~~ substrates is started after the number of carriers stored in said carrier stock section has reached a predetermined number.

Claim 8 (currently amended): The liquid processing apparatus according to claim 1, wherein ~~the substrates~~ housed in at least two carriers are collectively subjected to a liquid processing.

Claim 9 (original): The liquid processing apparatus according to claim 1, further comprising a parking area for temporally disposing a predetermined number of aligned substrates before the liquid processing in the vicinity of said liquid processing section.

Claim 10 (original): The liquid processing apparatus according to claim 1, further comprising another substrate inspecting device for inspecting the number and/or arranged state of substrates after the liquid processing.

Claim 11 (currently amended): A liquid processing apparatus comprising:

- a liquid processing section for applying a predetermined liquid processing to a substrate;
- a carrier delivery section for delivering a carrier having a plurality of substrates housed therein substantially horizontal a predetermined distance apart from each other;
- a carrier stock section capable of storing a plurality of carriers;
- a substrate transfer section for transferring ~~the substrate~~ a plurality of substrates from a carrier on the carrier stock section into said liquid processing section;
- a carrier transfer device for transferring ~~the~~ a carrier within said carrier stock section;
- a substrate inspecting device for inspecting the number and/or ~~the~~ housed state of substrates within ~~the~~ a carrier; and
- a carrier transfer device control section for controlling said carrier transfer device ~~such that the carrier is stored in said carrier stock section in the case where it is judged possible to apply a liquid processing to the substrate on the basis of the result of the inspection performed by said substrate inspecting device;~~

wherein the carrier stock section includes carrier holding members for holding carriers, and a substrate delivery stage through which substrates are transferred between the substrate transfer section and a carrier,

wherein the substrate transfer section ~~includes~~ includes:

- a substrate delivery device for delivering substrates into and out of ~~the~~ a carrier on the substrate delivery stage,
- a substrate transfer device for delivering substrates into and out of said liquid processing ~~section, section;~~
- a substrate transplanting device for delivering ~~the~~ substrates in a substantially horizontal state into and out of said substrate delivery device and for delivering ~~the~~ substrates in substantially a vertical state into and out of said substrate transfer device, and
- wherein the carrier transfer device control section controls the carrier transfer device to store a carrier on the carrier holding members of the carrier stock section, when it is judged possible to apply a liquid processing to substrates in the carrier with reference to an inspection result obtained by the substrate inspecting device, and

the carrier transfer device control section further controls the carrier transfer device, after a predetermined number of carriers are stored on the carrier holding members, to transfer the carriers from the carrier holding members to the substrate delivery stage, thereby allowing substrates housed therein to be transferred into the liquid processing section by the substrate transfer section.

Claim 12 (currently amended): The liquid processing apparatus according to claim 11, wherein said carrier transfer device is also capable of delivering ~~the a~~ carrier into and out of said carrier delivery section, said substrate inspecting device inspects ~~the substrate within the~~ substrates within a carrier transferred into said carrier stock section, said substrate transfer section transfers ~~the substrate~~ substrates between said carrier stock section and said liquid processing section, and said substrate delivery device delivers ~~the substrate~~ substrates into and out of the carrier within said carrier stock section.

Claim 13 (currently amended): The liquid processing apparatus according to claim 11, wherein said substrate transplanting device includes:

a posture changing mechanism for delivering ~~the~~ substrates in a substantially horizontal state into and out of said substrate delivery device and for changing the posture of ~~the substrate~~ substrates between a substantially horizontal state and a substantially vertical state; and

a substrate vertical holding mechanism for delivering ~~the~~ substrates in a substantially vertical state into and out of said posture changing mechanism and for delivering ~~the~~ substrates in a substantially vertical state into and out of said substrate transfer device.

Claim 14 (currently amended): The liquid processing apparatus according to claim 11, wherein said substrate inspecting device is capable of inspecting ~~the~~ substrates within ~~the a~~ carrier at the position where the substrates are delivered between said substrate transfer section and the carrier.

Claim 15 (currently amended): The liquid processing apparatus according to claim 11, wherein the carrier has a delivery port for delivering ~~the~~ substrates into and out of ~~the~~ a carrier and a lid for opening/closing said delivery port, and said apparatus further comprises a lid opening/closing mechanism for opening/closing said lid when the substrates within the carrier are inspected by said substrate inspecting device and/or the substrates are transferred between the carrier and said substrate transfer section.

Claim 16 (currently amended): The liquid processing apparatus according to claim 11, wherein said carrier transfer device is controlled by said carrier transfer device control section such that ~~the~~ a carrier, for which it has been judged that the liquid processing of the substrates within the carrier should be stopped, is returned back to said carrier delivery section.

Claim 17 (currently amended): The liquid processing apparatus according to claim 11, wherein said carrier transfer device is controlled by said carrier transfer device control section such that, where another carrier, which is to be processed and forms a pair with ~~the~~ a carrier for which it has been judged that the liquid processing of the substrates housed in the carrier should be stopped, is already stored in said carrier stock section, the another carrier is returned to said carrier delivery section.

Claim 18 (currently amended): The liquid processing apparatus according to claim 11, wherein the liquid processing of ~~the substrate~~ substrates is started after the number of carriers stored in said carrier stock section has reached a predetermined number.

Claim 19 (currently amended): The liquid processing apparatus according to claim 11, wherein ~~the~~ substrates housed in at least two carriers are collectively subjected to a liquid processing.

Claim 20 (original): The liquid processing apparatus according to claim 11, further comprising a parking area for temporally disposing a predetermined number of aligned substrates before the liquid processing in the vicinity of said liquid processing section.

Claim 21 (original): The liquid processing apparatus according to claim 11, further comprising another substrate inspecting device for inspecting the number and/or arranged state of substrates after the liquid processing.

Claim 22 (withdrawn): A liquid processing apparatus comprising:
a liquid processing section for applying a predetermined liquid processing to a substrate;
a carrier delivery section for delivering a carrier having a plurality of substrates housed therein substantially horizontal a predetermined distance apart from each other;
a carrier stock section capable of storing a plurality of carriers;
a substrate transfer section for transferring the substrate into said liquid processing section;
a carrier transfer device for transferring the carrier within said carrier stock section;
a substrate inspecting device for inspecting the number and/or the housed state of substrates within the carrier; and
a carrier transfer device control section for controlling said carrier transfer device such that the carrier is stored in said carrier stock section in the case where it is judged possible to apply a liquid processing to the substrate on the basis of the result of the inspection performed by said substrate inspecting device;
wherein said substrate transfer section includes:
a substrate transfer device for delivering substrates into and out of said liquid processing section; and
a substrate delivery/posture changing device for delivering the substrate into and out of the carrier and for changing the posture of the held substrate between a substantially horizontal state and a substantially vertical state for delivery of the substrate into and out of said substrate transfer device.

Claim 23 (withdrawn): The liquid processing apparatus according to claim 22, wherein said carrier transfer device is also capable of delivering the carrier into and out of said carrier delivery section, said substrate inspecting device inspects the substrate within the carrier transferred into said carrier stock section, said substrate transfer section transfers the substrate between said carrier stock section and said liquid processing section, and said substrate delivery/posture changing device delivers the substrate into and out of the carrier within said carrier stock section.

Claim 24 (withdrawn): The liquid processing apparatus according to claim 22, wherein said substrate delivery/posture changing device includes:

- a plurality of support plates having projecting portions abutting against the substrates formed in predetermined positions on the front and back surfaces and arranged substantially in parallel a predetermined distance apart from each other;

- a plate holding section for holding said plural support plates;

- a substrate holding pin fixed to substantially the tip portion on the opposite side of said plate holding section in each of said plural support plates;

- a substrate holding transfer guide movably arranged on the side of said plate holding section of said plural support plates;

- a plate sliding mechanism joined to said plate holding section and collectively moving said plural support plates into and out of the carriers within said carrier stock section;

- a swinging mechanism for collectively swinging said plural support plates by a predetermined angle; and

- a lift mechanism for moving up and down said plate holding section by a predetermined distance in a direction perpendicular to the front and back surfaces of said support plate;

wherein the substrate is held between said substrate holding pin and said substrate holding transfer guide thereby to permit the substrate to be held on the side of any of the front and back surfaces of said support plate.

Claim 25 (withdrawn): The liquid processing apparatus according to claim 22, wherein said substrate inspecting device is capable of inspecting the substrates within the carrier at the position where the substrates are delivered between said substrate transfer section and the carrier.

Claim 26 (withdrawn): The liquid processing apparatus according to claim 22, wherein the carrier has a delivery port for delivering the substrates into and out of the carrier and a lid for opening/closing said delivery port, and said apparatus further comprises a lid opening/closing mechanism for opening/closing said lid when the substrates within the carrier are inspected by said substrate inspecting device and/or the substrates are transferred between the carrier and said substrate transfer section.

Claim 27 (withdrawn): The liquid processing apparatus according to claim 22, wherein said carrier transfer device is controlled by said carrier transfer device control section such that the carrier, for which it has been judged that the liquid processing of the substrates within the carrier should be stopped, is returned back to said carrier delivery section.

Claim 28 (withdrawn): The liquid processing apparatus according to claim 22, wherein said carrier transfer device is controlled by said carrier transfer device control section such that, where another carrier, which is to be processed and forms a pair with the carrier for which it has been judged that the liquid processing of the substrates housed in the carrier should be stopped, is already stored in said carrier stock section, the another carrier is returned to said carrier delivery section.

Claim 29 (withdrawn): The liquid processing apparatus according to claim 22, wherein the liquid processing of the substrate is started after the number of carriers stored in said carrier stock section has reached a predetermined number.

Claim 30 (withdrawn): The liquid processing apparatus according to claim 22, wherein the substrates housed in at least two carriers are collectively subjected to a liquid processing.

Claim 31 (withdrawn): The liquid processing apparatus according to claim 22, further comprising a parking area for temporally disposing a predetermined number of aligned substrates before the liquid processing in the vicinity of said liquid processing section.

Claim 32 (withdrawn): The liquid processing apparatus according to claim 22, further comprising another substrate inspecting device for inspecting the number and/or arranged state of substrates after the liquid processing.

Claim 33 (withdrawn): A liquid processing apparatus comprising:
a liquid processing section for applying a predetermined liquid processing to a substrate;
a carrier delivery section for delivering a carrier having a plurality of substrates housed therein;
a carrier stock section capable of storing a plurality of carriers;
a carrier transfer device for transferring the carrier within said carrier stock section;
a substrate inspecting device for inspecting the number and/or housed state of the substrates in the carrier;
a carrier retreat device for transferring the carrier between the inspecting position where the inspection is performed by said substrate inspection device and a predetermined retreat position;
a carrier transfer device control section for controlling said carrier transfer device such that the carrier is stored in said carrier stock section in the case where it is judged possible to apply a liquid processing to the substrate on the basis of the result of the inspection performed by said substrate inspecting device; and
a substrate transfer section for transferring the substrate into said liquid processing section.

Claim 34 (withdrawn): The liquid processing apparatus according to claim 33, wherein said carrier transfer device is also capable of delivering the carrier into and out of said carrier delivery section, said substrate inspecting device is capable of inspecting the substrate within the carrier transferred into said carrier stock section, said substrate transfer section transfers the substrate between the carrier disposed on the inspecting position and said liquid processing section, and said substrate delivery device delivers the substrate into and out of the carrier within said carrier stock section.

Claim 35 (withdrawn): The liquid processing apparatus according to claim 33, wherein said carrier transfer device is controlled by said carrier transfer device control section such that, while the inspection by said substrate inspecting device is being applied to a carrier disposed on the inspecting position, said carrier transfer device holds another carrier that is to be inspected in the next step by said substrate inspecting device and is put in a waiting position in the vicinity of the inspecting position, and after the inspection of the carrier in the inspecting position has been finished and the inspected carrier is moved to the retreat position by said carrier retreat device, the carrier transfer device disposes the another carrier held by said carrier transfer device on the inspecting position, followed by receiving the carrier after the inspection from said carrier retreat device and subsequently storing the carrier in a predetermined position.

Claim 36 (withdrawn): The liquid processing apparatus according to claim 33, wherein said carrier transfer device is controlled by said carrier transfer device control section such that the carrier, for which it has been judged that the liquid processing of the substrates within the carrier should be stopped, is returned back to said carrier delivery section.

Claim 37 (withdrawn): The liquid processing apparatus according to claim 33, wherein said carrier transfer device is controlled by said carrier transfer device control section such that, where another carrier, which is to be processed and forms a pair with the carrier for which it has been judged that the liquid processing of the substrates housed in the carrier should be stopped, is already stored in said carrier stock section, the another carrier is returned to said carrier delivery section.

Claim 38 (withdrawn): The liquid processing apparatus according to claim 33, wherein the liquid processing of the substrate is started after the number of carriers stored in said carrier stock section has reached a predetermined number.

Claim 39 (withdrawn): The liquid processing apparatus according to claim 33, wherein the substrates housed in at least two carriers are collectively subjected to a liquid processing.

Claim 40 (withdrawn): The liquid processing apparatus according to claim 33, further comprising a parking area for temporally disposing a predetermined number of aligned substrates before the liquid processing in the vicinity of said liquid processing section.

Claim 41 (withdrawn): The liquid processing apparatus according to claim 33, further comprising another substrate inspecting device for inspecting the number and/or arranged state of substrates after the liquid processing.

Claim 42 (withdrawn): A liquid processing apparatus comprising:
a liquid processing section for applying a predetermined liquid processing to a substrate;
a carrier delivery section for delivering a carrier having a plurality of substrates housed therein substantially horizontal a predetermined distance apart from each other;
a carrier stock section capable of storing a plurality of carriers;
a substrate transfer section for transferring the substrate into said liquid processing section;
and
a carrier transfer device for transferring the carrier within said carrier stock section;
wherein said substrate transfer section includes:
a substrate transfer device for delivering the substrate into and out of said liquid processing section; and
a substrate delivery/posture changing device for delivering the substrates into and out of the carrier and for changing the posture of the held substrate between a substantially horizontal state and a substantially vertical state thereby transferring the substrate into and out of said substrate transfer device.

Claim 43 (withdrawn): The liquid processing apparatus according to claim 42,
wherein said carrier transfer device is also capable of delivering the carrier into and out of said carrier delivery section, said substrate transfer section transfers the substrate between said carrier stock section and said liquid processing section, and said substrate delivery/posture changing device delivers the substrate into and out of the carrier within said carrier stock section.

Claim 44 (withdrawn): The liquid processing apparatus according to claim 42, wherein said substrate delivery/posture changing device includes:

- a plurality of support plates having projecting portions abutting against the substrates formed in predetermined positions on the front and back surfaces and arranged substantially in parallel a predetermined distance apart from each other;

- a plate holding section for holding said plural support plates;

- a substrate holding pin fixed to substantially the tip portion in each of said plural support plates;

- a substrate holding transfer guide movably arranged on the side of said plate holding section of said plural support plates;

- a plate sliding mechanism joined to said plate holding section and collectively moving said plural support plates into and out of the carriers within said carrier stock section;

- a swinging mechanism for collectively swinging said plural support plates by a predetermined angle; and

- a lift mechanism for moving up and down said plate holding section by a predetermined distance in a direction perpendicular to the front and back surfaces of said support plate;

wherein the substrate is held between said substrate holding pin and said substrate holding transfer guide thereby to permit the substrate to be held on the side of any of the front and back surfaces of said support plate.

Claim 45 (withdrawn): A liquid processing method for applying a predetermined liquid processing to the substrates housed in a first carrier and a second carrier, comprising:

a first step for inspecting the number and/or housed state of the substrates within the first carrier;

a second step for storing the first carrier within the carrier stock section in the case where it is judged by the inspection in said first step that it is possible to apply a liquid processing, and for stopping the liquid processing applied to the substrates stored in the first and second carriers in the case where it is judged by the inspection in said first step that the liquid processing should be stopped;

a third step for inspecting the number and/or housed state of the substrates within the second carrier in the case where the first carrier is stored in the carrier stock section; and

a fourth step for transferring the substrates within the second carrier to the liquid processing section in the case where it is judged by the inspection in said third step that the liquid processing can be applied, followed by transferring the substrates within the first carrier into the liquid processing section, or, where it is judged by the inspection in said third step that the liquid processing should be stopped, for stopping the liquid processing of the substrates within the second carrier.

Claim 46 (withdrawn): The liquid processing method according to claim 45, wherein the arranged state of the substrates after the liquid processing is inspected.

Claim 47 (withdrawn): A liquid processing method for applying a liquid processing to predetermined substrates, comprising:

a first step for inspecting the number and/or housed state of the substrates within a carrier;

a second step for storing in a carrier stock section the carrier which has been judged to be capable of the liquid processing in the inspection in said first step and stopping the liquid processing in respect of the carrier for which it has been judged in the inspection in said first step that the liquid processing should be stopped;

a third step for carrying out said first step and said second step for a predetermined number of carriers;

a fourth step for transferring another carrier from the carrier stock section in the case where the another carrier, which is to be processed in a pair with the carrier for which it has been judged in the inspection in said first step that the liquid processing should be stopped, is already stored in the carrier stock section; and

a fifth step for starting the liquid processing that is applied to the substrates in the carrier after the number of carriers stored in the carrier stock section has reached the predetermined number.

Claim 48 (withdrawn): The liquid processing method according to claim 47, wherein the substrates in at least two carriers are collectively subjected to a liquid processing in said fifth step.

Claim 49 (withdrawn): The liquid processing method according to claim 47, wherein, while a liquid processing is being applied to a set of substrates in said fifth step, another set of substrates that are to be subjected to a liquid processing in the next stage are put in a waiting position in the vicinity of the process section in which the liquid processing is carried out.

Claim 50 (withdrawn): The liquid processing method according to claim 47, wherein the arranged state of the substrates after the liquid processing is inspected.